

Noteworthy anatomical and physiological researches.

The plant and its relation to iron.

The recent investigations by Professor Molisch¹, given a "mention honorable" by the Paris Academy, is one of the landmarks in physiology. As, however, the student of vegetable physiology will read the paper, we shall give only the main results. The first part of the book deals with iron-reagents in general, and here the author gives a new reagent which he describes in these words: "Die meisten organischen Verbindungen, welche Eisen in maskirter Form² enthalten, lassen selbst in ganz ausserordentlich geringen Mengen ihr Eisen erkennen, wofern man die betreffenden Objecte ein oder mehrere Tage oder Wochen in gesättigter wässeriger Kalilauge liegen lässt und dann nach raschem Auswaschen in reinem Wasser den gewöhnlichen Eisenreactionen, am besten der Ferrocyankaliumprobe, unterwirft." This method was³, however, on the suggestion of Arth. Meyer⁴, afterwards revised and it was found that the potassium hydrate would contain minute quantities of iron which the globoids of the aleurone grains, or other parts of the cells, can take hold of and hoard. This was the case, even when the reagent was selected as "chemically pure." Therefore, this part of the book must be used cautiously. Having then traced the iron in a great many plants throughout the vegetable world, the author proceeds to show the distribution of the substance within the cell-organism, in the various organs.

Among the algae, iron was found in *Cladophora aegropila* Rabenhorst, the membrane of which is, to some extent, covered with a yellow or red layer of this substance, the cell-wall being also more or less impregnated therewith. In *Peyssonnelia squamaria* Dne., *Valonia utricularis* Ag., and in *Oedogonium*, an incrustation of similar appearance is also observed, while in *Mesocarpus*, *Spirogyra*, and certain diatoms, iron was found also in the cell-contents, penetrating the nucleus and the chlorophyl-band. Among the fungi, *Rhizomorpha fusca*, and among the lichens, the so-called "oxidized lichens" (*Lecidea declinans* Nyl., and other species) displayed a con-

¹Die Pflanze in ihren Beziehungen zum Eisen. Jena. 1892. 3 Marks.

²I. e., in organic combination.

³Berichte der Deutschen Botanischen Gesellschaft. xi (1893) 73-75.

⁴Flora, 1892, Ergänzungsband p. 291.

siderable incrustation of iron. Among the mosses, *Fontinalis antipyretica* L. gave a very intense reaction, but only in the walls; the cell-contents never gave evidence of any amount of iron being present. In the procambium of the cotyledons of *Sinapis alba*, the author had a well marked reaction; during the first or second week of germination the iron disappears entirely.

Following this is a very important series of investigations on the "iron-bacteria:" *Crenothrix Kühniana* Rabenh.⁵, *Crenothrix dichotoma* Cohn, and *Leptothrix ochracea* Kütz., previously studied by Cohn⁶, Zopf⁷, and Hugo de Vries⁸ with regard to their iron-hoarding properties, and first noticed in this connection by Winogradsky;⁹ Molisch finds that the iron even after its oxidation in the "Gallerthülle" of these algae, never enters into their protoplasm. The outer slimy layer has a very singular attraction for the iron contained in the nutritive solution which there becomes oxidized. But the other parts of these plants have no specific oxidizing power.

By means of his reagent mentioned above, the author further showed that the chlorophyl-molecule contains *no* iron. Studies on chlorosis showed that deficiency of iron in the protoplasm of any plant which may be subject to chlorosis causes a general pathologic state of the plant, and that the condition named is only one feature thereof.

Fifty-five species of fungi gave iron-reaction. This, in connection with experiments in nutritive media, led to the result that at least for *Aspergillus niger* iron is indispensable, and that this substance seems to play a very important role in the life of many other fungi.—J. CHRISTIAN BAY.

Latent irritability.

Sachs¹⁰, referring to his very extensive studies of root-geotropism, calls attention to a special side of root-life of tropical and other epiphytes, namely to the fact that certain root-hairs are not geotropic, but follow other laws in growing out

⁵=Cl. polyspora Cohn.

⁶Cohn's Beiträge i. 108.

⁷Entwicklungsgeschichtliche Untersuchung über *Crenothrix polyspora*. Berlin, 1879.

⁸Die Pflanzen und Thiere in den dunklen Räumen der Rotterdamer Wasserleitung. Jena, 1890.

⁹Ueber Eisenbakterien. Botanische Zeitung. 1888, p. 261.

¹⁰Physiologische Notizen. V. Ueber latente Reizbarkeiten. (Flora, LVII (1893). 1-15.